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METHOD FOR RETRIEVING STORED MULTIMEDIA INFORMATION

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Specification

1. Title of the invention

METHOD FOR RETRIEVING STORED MULTIMEDIA INFORMATION

2. Claim

1. A method for retrieving a stored multimedia information, characterized by the fact that in a multimedia information storage and exchange system that stores message information consisting of coded voices and images received from optional video telephone terminals connected to a digital telephone network in mailboxes in a center and transmits a retrieved message information to the above-mentioned video telephone terminals when there is a retrieval request of the message information in the above-mentioned mailbox from optional video telephone terminals, an optional coded image information for retrieval is extracted from the message information stored in the above-mentioned mailbox; the coded image information for retrieval extracted is decoded; the image information for retrieval decoded is sub-sampled according to a prescribed reduction ratio to reduce the image; only a prescribed message

¹ Numbers in the margin indicate pagination in the foreign text.

information portion of said decoded image information is temporarily stored; the image information temporarily stored is drawn out and synthesized with the decoded image information for retrieval of one frame; a synthesized image information is prepared by encoding the image information synthesized and stored; if there is a retrieval request from an optional video telephone terminal, the above-mentioned synthesized image information for retrieval is drawn out and directly transmitted to the above-mentioned video telephone terminal; if the above-mentioned synthesized image information for retrieval does not exist, the above-mentioned reduced decoded image information is drawn out, synthesized with one frame, encoded to generate a synthesized image information for retrieval at real time, and transmitted to the above-mentioned video telephone terminal; said video telephone terminal selects and retrieves an optional message from several messages of the above-mentioned synthesized image information for retrieval.

3. Detailed explanation of the invention

(Industrial application field)

The present invention pertains to a method for retrieving a stored multimedia information that automatically prepares an image for retrieval at real time in a storage and information

exchange system of a message information consisting of voices and image information sent via a digital video telephone network, sends it to a user, rapidly retrieves the stored /2 information, and can read out a desired voice and image information.

(Prior art)

Image information supply type services that store image information in an information processing center connected to a digital telephone network and have access to the image information from each terminal via a telephone network have been provided.

For example, a communication system (visual message dial system) that directly inputs a real-time image information by a user using INS net 64 and can freely drawn it out is developed. In the visual message dial system, a center that inputs, stores, and outputs messages consisting of images and a terminal of a video telephone are connected by INS net 64. In an image transmission and a voice transmission, 64 Kbps is respectively used, and for example, a message with a face confirmation, a presentation using a figure, etc., are possible.

In such a service, in order to have access the image information stored in the information processing center from the

terminal and read out a necessary image information, it is essential to have a good retrieval function.

On the other hand, as one of the representative retrieval functions being provided to terminal users, there is a direct retrieval function that displays a list of title images in a reduced image shape by representing the contents of each stored image information and directly selects a desired access information from them. This function is very effective as a retrieval method in the case where a specific classification arrangement for retrieval is not carried out for stored information groups or in the case where a specific classification arrangement is not carried out since it cannot predict which information is interested by each user.

However, in the retrieval by a list display of the above-mentioned reduced title images, since the image information being actually stored are separate images for retrieval, images for retrieval must be separately prepared by the information processing center in order to implement the direct retrieval function.

Also, in a videotex service which is a representative image information supply type service, it is a specific image provider that provides stored image information, and a general terminal user mainly draws out the image information being provided and

views or utilizes it. Therefore, in such a service, it is necessary to register the image information itself being provided in the information processing center by preparing images for retrieval in accordance with the image information being provided by the center and to register and store the images for retrieval.

(Problems to be solved by the invention)

Recently, along with the supply of digital communication networks, as terminals that utilize high speed and high band characteristics of the digital communication networks, the development of image terminals such as digital video telephone and multimedia information storage and exchange services for exchanging multimedia messages consisting of images and voices has been advanced. For example, in "Proposal of Real-Time Image and Voice Information Storage and Exchange Service Method" described in pp.1-113 of "Information Processing Society, 41st National Convention Lecture Thesis Collection," a multimedia information storage and exchange service is mentioned.

In the multimedia information storage and exchange service, the storage of image and voice messages from a terminal to a center and the transmission of the stored image and voice messages from the center to the terminal are simultaneously carried out between the information processing center connected

to a digital communication network and the image terminal such as digital video telephone. For this reason, a stored information retrieval method in which a direct retrieval is effective is used similarly to the above-mentioned image information supply type service. However, the above-mentioned image information supply type service is a service that stores image information in the center by an image provider, has access to the center by a general terminal, and retrieves and reads out a desired image information, and the center has a time margin until the provided images are registered after receiving them. On the contrary, the multimedia information storage and exchange service is a service that stores and exchanges the transmission and reception of image and voice messages being carried out between each image terminal, and the exchange has no time margin until the image information are stored and transmitted after receiving them.

As a result, in the multimedia information storage and exchange service, since the image and voice messages being sent at each optional time from the image terminal such as digital /3 video telephone are stored, there is a no margin for preparing images for retrieval in advance and storing them in the information processing center, unlike the image information

supply type service. Therefore, the former method cannot be applied to the latter method.

Also, the image information from the digital video telephone are usually compressed and encoded, transmitted onto a line, and stored in an encoded state in the center. Therefore, in case the above-mentioned direct retrieval is implemented in the center, it is necessary to implement other image processing, not to mention decoding and encoding of images, so that the response time for transmitting the image information for retrieval to the terminal is lengthened, thereby increasing the center load.

Furthermore, a method that transmits several image information to video telephone terminals in advance and displays on a multi-screen at the terminal is also considered, however in this case, a video signal decoder with a high compression rate is required, so that the function increase at the terminal is in demand.

The purpose of the present invention is to solve these conventional problems and to provide a method for retrieving a stored multimedia information that can prepare images for retrieval at real time from image message information being sent from an image terminal such as digital video telephone and does not require a function increase at the terminal, since a direct

retrieval function is realized by a multimedia information storage and exchange service.

(Means to solve the problems)

In order to achieve the above-mentioned purpose, the method for retrieving a stored multimedia information is characterized by the fact that an optional coded image information for retrieval is extracted from the message information stored in the mailbox; the coded image information for retrieval extracted is decoded; the image information for retrieval decoded is sub-sampled according to a prescribed reduction ratio to reduce the image; only a prescribed message information portion of said decoded image information is temporarily stored; the image information temporarily stored is drawn out and synthesized with the decoded image information for retrieval of one frame; a synthesized image information is prepared by encoding the image information synthesized and stored; if there is a retrieval request from an optional video telephone terminal, the synthesized image information for retrieval is drawn out and directly transmitted to the video telephone terminal; if the synthesized image information for retrieval does not exist, the reduced decoded image information is drawn out, synthesized with one frame, encoded to generate a synthesized image information for retrieval at real time, and transmitted to the video

telephone terminal; said video telephone terminal selects and retrieves an optional message from several messages of the synthesized image information for retrieval.

(Operation)

In the present invention, using the image information among the message information (coded voices and image information) being sent to the center from the information provider (digital video telephone), images for retrieval at a time of the retrieval of these message information are prepared. In the conventional method, each time information is provided, images for retrieval have been manually renewed. On the contrary, in the present invention, when information are provided, they are automatically renewed at real time, and images for retrieval are prepared.

In other words, in the center in the present invention, when the message storage from the terminal is completed, an appropriate partial image information of the messages is extracted, and the image is decoded by the decoder and sub-sampled at the compression ratio corresponding to the number of screen split of the image information for retrieval. The number of picture element is reduced, and the images are stored in a temporary storage for the image information for retrieval. At the same time, the reduced images for retrieval generated by the

processing, the reduced images for retrieval already stored in the temporary storage, and if necessary, the reduced images of dummy images are synthesized in a two-dimensional planar shape, so that an image information for retrieval of a multi-screen is generated, encoded by the image encoder, and stored in the storage device for the image information for retrieval. In this case, a terminal user may not be aware of the processing during the storage for postprocessing of the message storage, and since the processing for generating the images for retrieval of the latter-half multi-screen can be implemented in an empty time of the center processing, the operation in accordance with the load state at the center is possible.

On the other hand, when a retrieval is requested from the terminal, the center transmits an image information for retrieval already generated, implements an image information /4 generation processing for retrieval at real time when there is a non-generated image information for retrieval, stores it, and transmits it to the terminal. In almost all the cases, since the coded image information for retrieval is only transmitted, a terminal user can immediately view the retrieving screen during the retrieval. In the worst case, though the time for generating one image screen for retrieval is required, since only the processing time for the synthesis of the multi-screen

and the encoding is required, a high-speed processing is possible.

(Application example)

Next, an application example of the present invention is explained in detail by the figures.

Figure 1 is an entire constitutional diagram showing a stored multimedia information retrieval system which is an application example of the present invention.

In Figure 1, 11-1L are optional video telephone terminals being connected to a digital telephone network, 21-2L are digital subscriber lines, 5 is a digital telephone network, 10 is a digital subscriber line, 20 is a center, and 21 is an audio image information storage part.

In the center 20, in order to generate an image for retrieval at real time from the image message information being sent from the image terminals 11-1L such as digital video telephone, a specific one screen of the image message is automatically extracted as a title image. In order to generate the image for retrieval from the automatically extracted title image, a realizing method at the center 20 is used in terms of versatility, etc. In other words, the corresponding image encoder and decoder built in a minimum digital video telephone are mounted at the center 20, and an image decoding and decoding

processing with a large load is distributed, and other processing are applied using a processing empty time of the center, so that a high-speed responsivity to the terminals 11-1L and an efficient processing at the center 20 are implemented.

Also, all the video telephone terminals have the same constitution and are provided with voice and image transmission and reception functions, the same screen resolution, and dial information transmission and reception functions. The center 20 is provided with the same voice and image encoding and decoding functions and dial information transmission and reception functions as those of the video telephone terminals 11-1L, and several mail boxes are opened in the internal audio image information storage part 21.

Figure 2 is a constitutional diagram showing the center in Figure 1.

In Figure 2, 30 is a line control part provided with a terminal function of a digital telephone network, 31 is an audio image information storage part for storing coded voice and image message information being sent from the video telephone terminals 11-1L, 32 is an image information extraction part that extracts an optional partial image information from the message information stored in the audio image information storage part 31, 33 is a decoding part for decoding the extracted image

information, 34 is an image information sampling part for sampling a decoded image information, 35 is a sampled image storage part for storing n-1 screens of the sampled image information when an image for retrieval is a n split screen, 36 is an image synthesis part for synthesizing n screens of the sample screens, 37 is an encoding part for encoding the image synthesis information, 38 is a retrieved image storage part for storing the synthesized encoded image information for retrieval, and 39 is a retrieval control part for controlling the audio image information storage part 31, image information extraction part 32, sampled image storage part 35, image synthesis part 36, and retrieved image storage part 38 during processing from each video telephone terminals 11-1L.

The operations of Figures 1 and 2 are mentioned.

An optional mailbox i is designated from an optional video telephone terminal 11, and a communication information 50 is connected via the digital telephone network 5 and transmitted to the line control part 30 of the center 20.

In the center 20, the communication information 50 meaning the designation of the mailbox i received from the video telephone terminal 11 is separated into a voice and image message information 51 and a key input information 52 in the line control part 30, and the former is transferred to the audio

image information storage part 31 and stored. The latter decides the end of the voice and image message information destined to the mailbox i in the retrieval control part 39. When it is decided that the voice and image message destined to the mailbox i is finished, the retrieval control part 39 inputs an optional partial image information extraction instruction 70 from the stored message information in the mailbox i into the image information extraction part 32. The image information extraction part 32 extracts an optional image from the voice and image information storage part 31 and inputs an extracted /5 image information 53 into the decoding part 33. The decoding part 33 decodes the extracted image information input from the image information extraction part 32 and inputs a decoded image information 54 into the image information sampling part 34. The image information sampling part 34 samples the decoded image information 54 in accordance with the size of a reduced screen being displayed at the terminal during the retrieval, reduces the amount of information, and stores a sampled image information 55 converted into a reduced image. In this case, the information are stored up to the amount of information of $n-1$ for the number n of reduced images being displayed on one screen, and when a new sampled image is stored or if the amount of information of one screen is attained, the sampled image

information 55 is input into the image synthesis part 36. The image synthesis part 36 synthesizes the input sampled image information 55 on one screen and inputs the image synthesis information 56 into the encoding part 37. The encoding part 37 compresses and encodes the image synthesis information 56 and inputs the image information 57 for retrieval into the retrieved image storage part 38. The retrieved information storage part 38 stores the compressed encoded image information 57 for retrieval.

Next, a method that retrieves a message information in the mailbox i and reads it out is mentioned.

An optional video telephone terminal 13 is connected to the center 20, and the communication information 50 of the video telephone terminal 13 is transferred as the key information 52 via the line control part 30 of the center 20 from the line control part 30 to the retrieval control part 39. For a retrieval request instructed from a terminal user by the key information 52, the retrieval control part 39 reads out the retrieved image storage part 38 as to whether or not the image information 57 for retrieval for the corresponding mailbox is stored and transfers the retrieved image information 57 to the line control part 30. If it is decided that the corresponding information does not exist, the sampled image information 55 of

the sampled image storage part 35 is further retrieved, and a retrieval result information 72 is decided. If it is decided that the corresponding information exists in the sampled image storage part 35, an image synthesis instruction 73 of the sampled image information 55 of the sampled image storage part 35 is sent to the image synthesis part 36. The image synthesis part 36 synthesizes the sampled image information to one image, encodes it by the encoding part 37, and transfers the image information 57 for retrieval to the retrieval control part 39. After receiving the transfer, the retrieval control part 39 transfers the image information 57 for retrieval to the line control part 30. The line control part 30 transmits the image information 57 for retrieval to the video telephone terminal 13 and waits for the next communication information 50 from the video telephone terminal 13. If the next communication information 50 is input into the retrieval control part 39 via the line control part 30, when it is a retrieval request, the same processing as the above-mentioned information retrieval request is carried out. Also, for an information readout request, the retrieval control part 39 sends a readout instruction 74 of the voice and image message information 51 stored in the voice image information storage part 31. The voice and image information storage part 31 transfers the voice

and image message information 51 to the line control part 30. The line control part 30 outputs a message to a display and a telephone set of the video telephone terminal 13 by transmitting the transferred voice and image message information 51 to the video telephone terminal 13.

After receiving the image information for retrieval, the video telephone terminal 13 selects an optional message from the image information of several messages once displayed in one screen and can retrieve a desired message.

First, if an optional mailbox is designated from the video television terminal and a voice and image information is sent (step 101), the end of the information is decided (step 102), and the extraction of an optional partial image information from the stored message information is instructed (step 103). Thus, the image information extraction part 32 extracts an image as a retrieval image (step 104), decodes it (step 105), samples it in accordance with the size of a reduced screen for displaying it at the terminal (step 106), and stores it. Next, the input sampled image information is synthesized with a screen (step 107) and further compressed and encoded, so that an image information for retrieval is generated (steps 108 and 109).

If a retrieval request from the video telephone terminal exists (step 201), the image information for retrieval is

retrieved (step 202), and whether or not the information exists is decided (step 203). If the image information exists, it is read out and transmitted to the video telephone terminal from /6 which the request is made (step 204). Also, there is no image information for retrieval, an image information for retrieval is generated at real time from the sampled image storage part 35. For this purpose, the sampled image information is retrieved (step 205), and whether or not the information exists is decided (step 206). If the information exists, an image synthesis instruction is output (step 207), and the sampled image information is synthesized with a screen (step 208). Then, it is encoded (step 209). The image information for retrieval is transmitted to the terminal from which the request is made (step 210). Then, the next reception from the terminal is waited (step 211). If there is a reception, the flow returns to step 101 or 201.

Thus, in this application example, even in a multimedia information storage and exchange service, when there is a retrieval request from the terminal, the image information for retrieval already generated is transmitted to the center, and if the image information is not generated yet, an image information is generated at real time and stored, so that a terminal user can immediately view a retrieving screen during the retrieval.

(Effects of the invention)

As explained above, according to the present invention, an image information for retrieval is sent to a video telephone terminal, and a desired readout information from a multi-screen is selected by the video telephone terminal, so that the information stored in the center can be read out at random, thereby being able to shorten the retrieval time. Furthermore, since the message information is displayed on the multi-screen of the video telephone terminals, the contents of partial of various message information can also be detected.

4. Brief description of the figures

Figure 1 is an entire constitutional diagram showing a stored multimedia information retrieval system which is an application example of the present invention. Figure 2 is a constitutional diagram showing a center in Figure 1. Figure 3 is an operational flow chart showing a retrieved image generation and a retrieval readout processing in the center.

11-1L Video telephone terminals

5 Digital telephone network

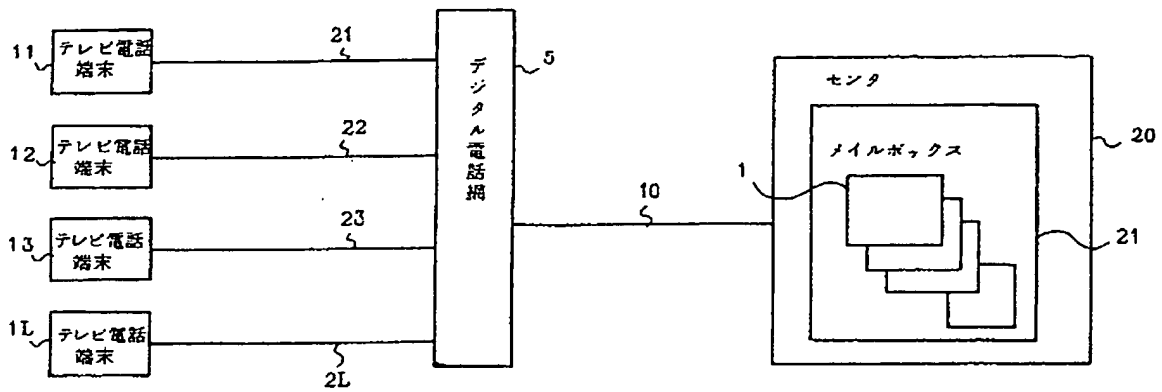
10, 21-2L Digital subscriber lines

20 Center

21 Mailbox

- 30 Line control part
- 31 Voice and image information storage part
- 32 Image information extraction part
- 33 Decoding part
- 34 Image information sampling part
- 35 Sampled image storage part
- 36 Image synthesis part
- 37 Encoding part
- 38 Retrieved image storage part
- 39 Retrieval control part

第 1 図



第 2 図

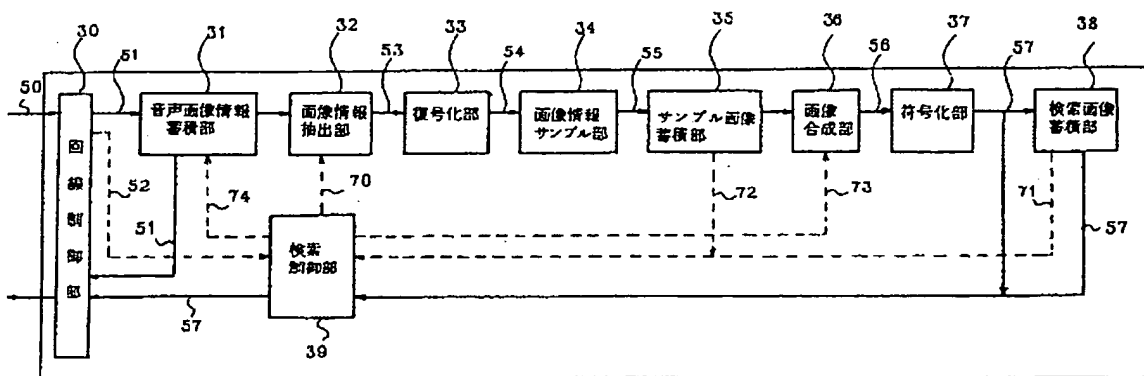


Figure 1:

11 Video telephone terminal

- 12 Video telephone terminal
- 13 Video telephone terminal
- 1L Video telephone terminal
- 5 Digital telephone network
- 20 Center
- 1 Mailbox

Figure 2:

- 30 Line control part
- 31 Audio image information storage part
- 32 Image information extraction part
- 33 Decoding part
- 34 Image information sampling part
- 35 Sampled image storage part
- 36 Image synthesis part
- 37 Encoding part
- 38 Retrieved image storage part
- 70 Retrieval control part

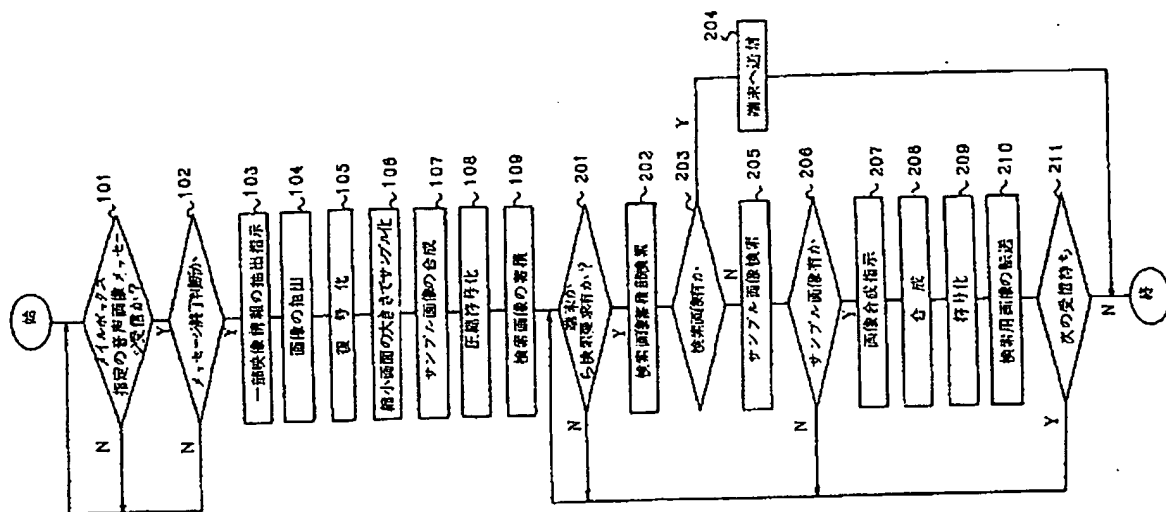


Figure 3:

A. Start

B. End

101 Reception of an audio image message designated by a mailbox?

102 Decision of message end?

103 Extraction instruction of partial image information

104 Extraction of image

105 Decoding

106 Sampling at a reduced screen size

107 Synthesis of sampled image

- 108 Compressing and encoding
- 109 Storage of retrieved image
- 201 Existence of a retrieval request from a terminal?
- 202 Retrieval of retrieved image storage part
- 203 Existence of a retrieved image?
- 204 Transmission to terminal
- 205 Sampled image retrieval
- 206 Existence of a sampled image?
- 207 Image synthesis instruction
- 208 Synthesis
- 209 Encoding
- 210 Transfer of an image for retrieval
- 211 Wait for the next reception